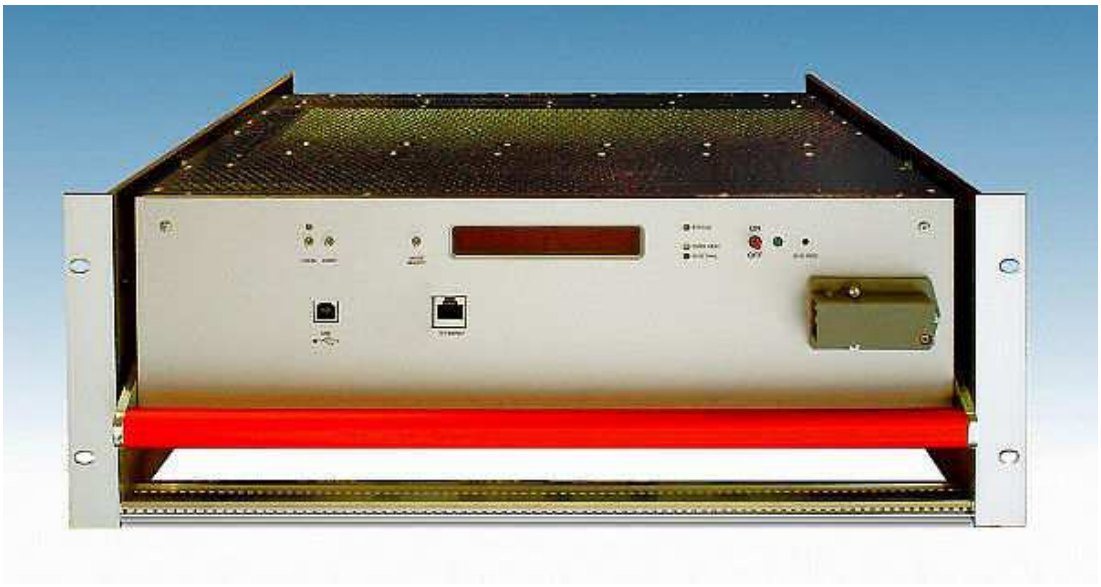

PG501

Bipolar Current Source for Magnet Supply

Technical Manual

General Remarks

The only purpose of this manual is a description of the product. It must not be interpreted as a declaration of conformity for this product including the product and software.

W-Ie-Ne-R revises this product and manual without notice. Differences of the description in manual and product are possible.

W-Ie-Ne-R excludes completely any liability for loss of profits, loss of business, loss of use or data, interrupt of business, or for indirect, special incidental, or consequential damages of any kind, even if **W-Ie-Ne-R** has been advises of the possibility of such damages arising from any defect or error in this manual or product.

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Control Cabinet

In the context of this user manual, the control cabinet must fulfill the requirements on fire-protective enclosures according to EN 60950 / IEC 60950 / UL 60950.

All devices are intended for operation in control cabinets or in closed areas. The LAN connection and all wire connections between the different system parts must be done via shielded cable with conductive connector shells, which are fixed with screws.

Furthermore, an additional fire-protective enclosure is required which must not affect proper air circulation.

Mains Voltage and Connection

The Power supplies are equipped with a “World”- mains input (rated voltage range: 100-240 VAC, frequency: 50-60 Hz, rated current: 16 A). Before connecting to the mains please double-check correspondence.

The mains input connection at the power supply side is described in chapter 2.1 (AC Mains Connection) at page 3.

Safety

After connecting the Power box to the mains, the mains input module is powered permanently. Filter and storage capacitors of the power factor correction module are charged with about **400VDC**. Any DC-On-Signal as well as a power switch at control board (if any installed) operates as a low voltage DC on/off switch only and not as a mains breaker. **Therefore it becomes dangerous if the box cover is open. In this case a lot of components on high voltage potential get touchable!**

Before starting any kind of work inside the power box remove the unit from mains and wait a couple of minutes with your activities! Discharge the primary DC filter-capacitors by use of a well insulated 22 ohm 10W resistor.
We recommend in case of any malfunction to send the power box to Wiener or to one of our representative for service

Declaration of Conformity

Low Voltage Directive 73/23/EEC and EMC Directive Art. 10.1 of 89/336/EEC

W-IE-NE-R

Plein & Baus GmbH

---

declare under our own responsibility that the product

PG5 / PL6, F8-12

Items: 0P00.xxxx; 0P01.xxxx; 0P04.xxxx; 0M11.xxxx; 0M21.xxxx; 0PG0.xxxx

is in accordance with the following standards or standardized documents:

1.	**EN 60 950-1:2001** + Corr:2004-09	Niederspannungsrichtlinie [low voltage directive]
2.	**EN 61 000-6-3:2001**	Störaussendung EMA [RF emission]
	EN 55 022:1998 + Corr:2001 + A1:2000 Kl. B	Störspannung [conducted noise]
	EN 55 022:1998 + Corr:2001 + A1:2000 Kl. B	Störfeldstärke [radiated noise]
	EN 61 000-3-2:2001	Oberschwingungen [harmonics]
	EN 61 000-3-3:1995 +Corr:1997 +A1:2001	Spannungsschwankungen [flicker]
3.	**EN 61 000-6-2:2001**	**Störfestigkeit EMB [immunity]**
	EN 61 000-4-6:1996 + A1:2001	HF-Einströmung [injected HF currents]
	EN 61 000-4-3:1996 + A1:1998 + A2:2001	HF-Felder [radiated HF fields] incl. ”900MHz”
	EN 61 000-4-4:1995 + A1:2001	Burst
	EN 61 000-4-5:1995 + A1:2001	Surge
	EN 61 000-4-11:1994 + A1:2000	Spannungs-Variationen [voltage variations]
	EN 61 000-4-2:1995 + A1:1998 + A2:2001	ESD

Conditions:

This unit is not a final product and is foreseen for use inside a closed cabinet. The supplying of loads over long distances (>3m) needs possibly additional RF rejection hardware to get in conformity of the definition. Admitted for powering by all mains.

Name and signature of authorized person — Place and Date

Andreas Köster

Manager — Jul. 2010

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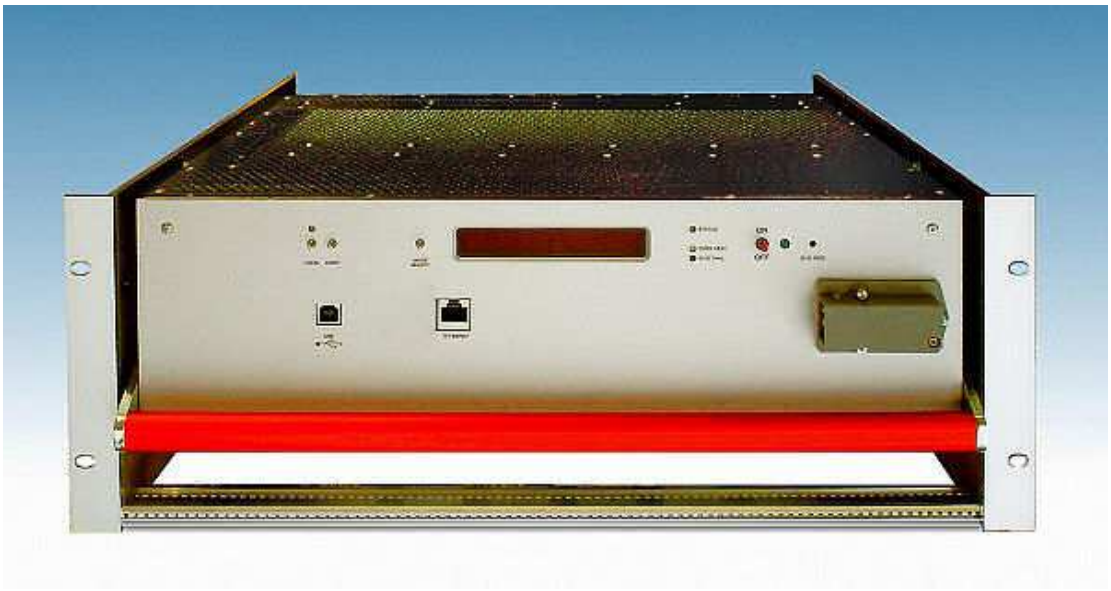
1 General Information



Features

- **processor controlled, potential free outputs**
- **up to 1.5 kW DC output power**
- **Programmable output voltage, current limit and rise/fall time**
- **Measurement of output voltages and current**
- **Fully controlled, programmable trip thresholds (min./max. sense voltage, max terminal voltage, max. current, power, temperature)**
- **PC-Control (connected to USB) with free available software**
- **Ethernet connection IEEE 802.3 10BASE-T and IEEE 802.3u 100BASE-TX**
- **WWW-Server integrated, full control via SNMP protocol**
- **OPC server available**
- **Ultra-high precision current measurement and stability**
- **Extremely low noise and ripple**
- **CE conform EN 50 081/82 part 2 or 1, safety in accordance with EN 60 950**
- **Sinusoidal mains current EN 61000-3-2**
- **Optional alphanumeric display**
- **Optional global interlock**
- **Optional direct water cooling**
- **Optional *Power Bin*: Exchange of the power box without disconnecting the cabling to the load**

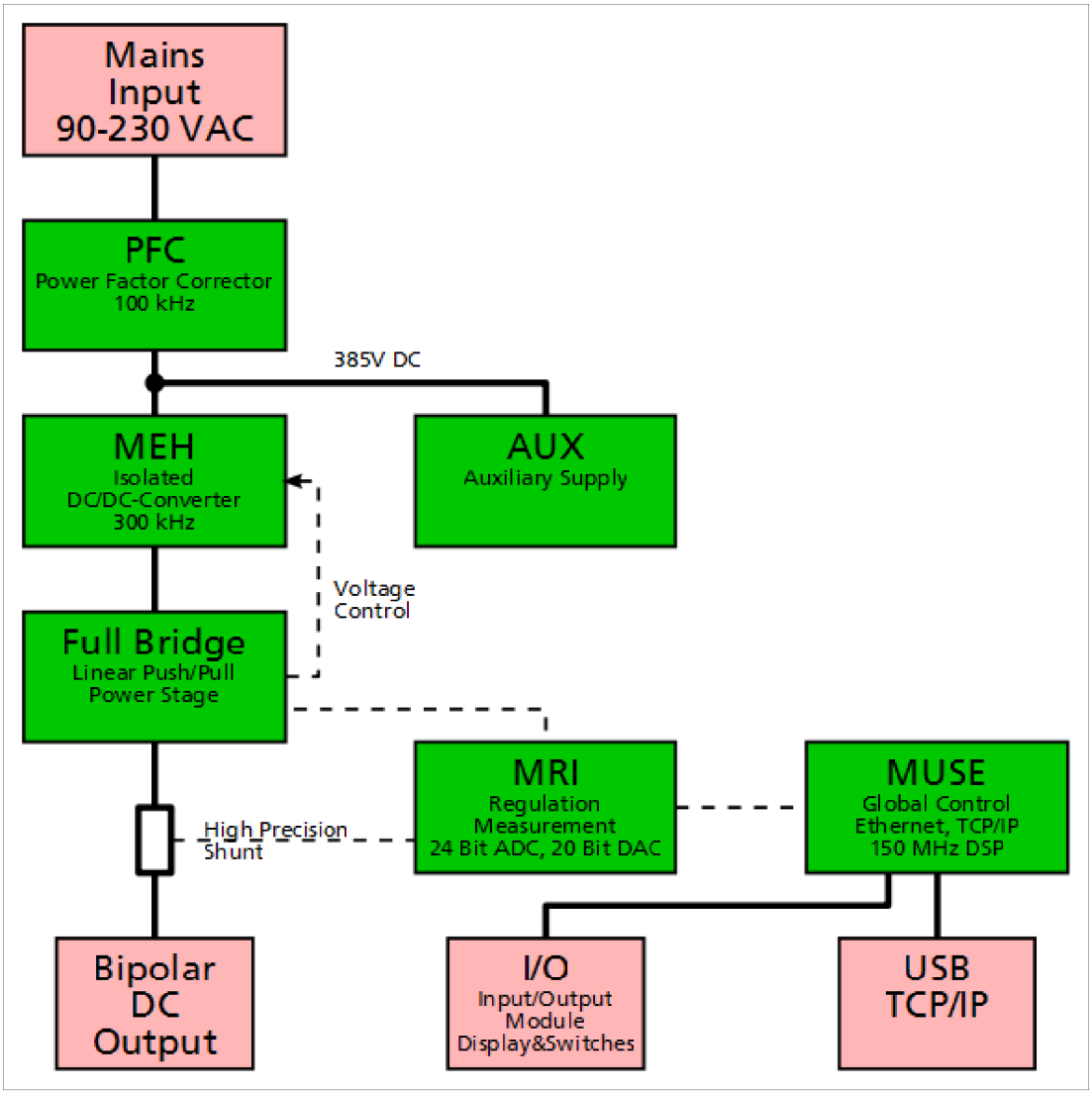


Figure 1.1: PG501 Bock Diagram

2 PG501 Power Box

The PG501 front appearance differs slightly, depending on the existing options.

Figure 2.1: PG501 Front Side with Interlock and Water-Cooled Option

Figure 2.2: PG501 Front Side with Display Option

2.1 AC Mains Connection

The AC input connections are made with the Hirschmann connector series ST.

We recommend the mating cable plug STAK3N with the locking retainer STASI3.

AC Input	Pin	Signal	Comment
	1	Phase	Cable wire color: black or brown wire
	2	Return, Neutral	Cable wire color: blue
	3	unused	
	Earth	Protective Earth	Safety Ground, Cable wire color: green / yellow

Table 1: AC Mains Input Connector Pin Assignment

2.2 Main Switch

The green illuminated rocker switch works as a global inhibit input.

- 0 Power outputs disabled
- I Switch is lighting, power outputs may be enabled by the remote control.

This switch is a logic switch only. It does not disconnect the mains supply.

With the *Alphanumeric Display Option* the switch is omitted.

2.3 USB Connector

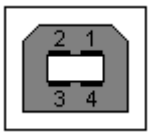
USB Socket	Pin	Signal	Comment
	1	VCC	
	2	D-	
	3	D+	
	4	GND	

Table 2: USB Connector Pin Assignment

This is the standard USB connector type B.

2.4 Ethernet Connector

RJ45 Socket	Pin	Signal	Comment
	1	TX+	
	2	TX-	
	3	RX+	
	4	GND 1	
	5	GND 1	
	6	RX-	
	7	GND 2	
	8	GND 2	

Table 3: Ethernet Connector Pin Assignment

This is the standard NIC configuration. **You need a** 1:1-cable to connect a to a HUB, or a **cross-over cable to connect to** another NIC (e.g. **a computer**). *There is no automatic signal crossing like with some routers.*

2.5 Water Cooling Connection (Optional)

The water connections are made with quick couplings series LC 6.4 mm from *Colder Products Company* (CPC). We recommend an elbow mating plug with shutoff, e.g. LCD230-04.

Consider that water inlet and water outlet are **not** exchangeable.

The safety valve may not be readjusted by the customer.

2.6 Global Reset Input (Optional)

The global reset input (POWER_INHIBIT) is provided to force all outputs to be switched off.

- connected to GND Power outputs disabled
- floating Power outputs may be enabled by the remote control

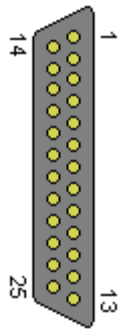
DSUB25 female	Pin	Signal	Comment
	1	NC	reserved
	14	NC	reserved
	2	NC	reserved
	15	NC	reserved
	3	NC	reserved
	16	NC	reserved
	4	NC	reserved
	17	NC	reserved
	5	NC	reserved
	18	NC	reserved
	6	NC	reserved
	19	NC	reserved
	7	NC	reserved
	20	NC	reserved
	8	NC	reserved
	21	NC	reserved
	9	NC	reserved
	22	NC	reserved
	10	NC	reserved
	23	NC	reserved
	11	NC	reserved
	24	NC	reserved
	12	NC	reserved
	25	GND	Ground of the aux. supply, connected to USB ground
	13	POWER_INHIBIT	Inhibit input

Table 4: Global Reset Connector Pin Assignment

The signals shall be connected by an isolated contact (e.g. relays), and must not be connected to other potentials.

The input has an internal 10 kΩ pull-up resistor to 5V and an input impedance of 10 kΩ.

It is possible to invert the logic of this signal by changing a jumper switch inside of the power box..

Jumper at Pin	POWER_INHIBIT Input	Functionality
1 – 2	open	power disabled (INTERLOCK)
	connected to GND	power enabled
2 – 3	open	power enabled
	connected to GND	power disabled (RESET)

2.7 Channel-Wise Interlock Input (Optional)

The channel-wise interlock inputs are provided to force a dedicated output to be switched off.

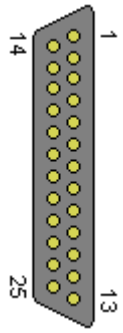
DSUB25 female	Pin	Signal	Comment
	1	Interlock U0 +	
	14	Interlock U0 -	
	2	Interlock U1 +	
	15	Interlock U1 -	
	3	Interlock U2 +	
	16	Interlock U2 -	
	4	Interlock U3 +	
	17	Interlock U3 -	
	5	Interlock U4 +	
	18	Interlock U4 -	
	6	Interlock U5 +	
	19	Interlock U5 -	
	7	Interlock U6 +	
	20	Interlock U6 -	
	8	Interlock U7 +	
	21	Interlock U7 -	
	9	Interlock U8 +	
	22	Interlock U8 -	
	10	Interlock U9 +	
	23	Interlock U9 -	
	11	Interlock U10 +	
	24	Interlock U10 -	
	12	Interlock U11 +	
	25	Interlock U11 -	
	13	reserved	

Table 5: Channel-Wise Interlock Connector Pin Assignment

Each interlock input is galvanically isolated (optocouplers). If a channel is interlocked, it is not possible to switch it on.

Signal level:

interlocked: -10 V ... +0.8 V

not interlocked: +2.2 V ... +10 V (input impedance 1 kΩ + LED, so higher input voltages can be used if an external resistor is implemented.)

2.8 Global Stop and Start Inputs (Optional)

This inputs allow to switch off the outputs channels (emergency stop) or to switch on all power supply outputs (e.g. used for maintenance) .

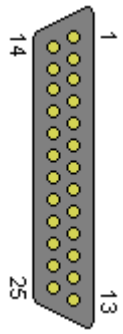
DSUB25 female	Pin	Signal	Comment
	1	NC	reserved
	14	NC	reserved
	2	NC	reserved
	15	NC	reserved
	3	NC	reserved
	16	NC	reserved
	4	NC	reserved
	17	NC	reserved
	5	NC	reserved
	18	NC	reserved
	6	NC	reserved
	19	NC	reserved
	7	NC	reserved
	20	NC	reserved
	8	NC	reserved
	21	NC	reserved
	9	NC	reserved
	22	NC	reserved
	10	NC	reserved
	23	NC	reserved
	11	NC	reserved
	24	NC	reserved
	12	STOP	reserved
	25	GND	Ground of the aux. supply, connected to USB ground
	13	START	Inhibit input

Table 6: Global Stop and Start Connector Pin Assignment

The signals shall be connected by a dry contact (e.g. relay), and must not be connected to other potentials.

The input has an internal 330 Ω pull-up resistor to 5V and an input impedance of 1 kΩ.

Signal	Functionality
STOP	If this signal is connected to GND (dry contact close), all power supply outputs are switched off. This functionality has priority over all other functions, it is not possible to switch outputs on in this state
START	If this signal is connected to GND (dry contact close), all power supply outputs are switched on. They will only be switched off in case of an emergency switch off caused by the supervision logic of the power supply. If this signal is not connected (dry contact open), power supply outputs may be switched on/off via SNMP or with the display control.

2.9 Alphanumeric Display (Optional)

This option allows the setup and display of some power supply items with toggle switches.

2.9.1 LED Description

- Power LED (green, 5mm) — Lighting if the PG501 is operating. Channels may be on.
- Status LED (green, 3mm) — Lighting if the main processor is working properly .
- Overheat (yellow) — Lighting if the operating temperature inside of the power supply is too high.
- SYS FAIL (red) — Processor malfunction.

2.9.2 Function of the Switches

After the PG501 has been switched on by pushing the “Power” switch up, the main operation modes can be selected by pushing the “Mode Select” switch up or down.

Many main operating modes do have one or more submenus, which can be accessed by a special procedure.

You will use the following switches of the PG501:

Symbol	Description	Remarks
P▲	Push “Power” switch up (ON)	**Main power supply is off:** Switch the power supply on. All power channels are off. **Display shows a switched off channel:** Switch this channel on. **Submenu:** OK button. Used to enter the selected submenu, request to change a value, accept the changes.
P▼	Push “Power” switch down (OFF)	**Display shows a switched off channel:** Switch the main power supply and all channels off. **Display shows a switched on channel:** Switch this channel off. **Submenu:** CANCEL button. Used to leave a submenu, discard the changes.
M▲	Push “Mode Select” switch up	**Main operating mode:** Select the next operating mode. **Submenu:** Change the selected item to the next possible state.
M▼	Push “Mode Select” switch down	**Main operating mode:** Select the previous operating mode. **Submenu:** Change the selected item to the previous possible state.

The following example describes the detailed steps to enter a sub menu and change the IP gateway address.

Description	Switch	Display [1]
switch the crate on	P▲	`U0  5.01V  1.2A`
select the requested main operation mode	M▲ or M▼ (until right mode is displayed)	`TCPIP: no link`
enter submenu	M▲(push and hold), P▲	`Config: Wait`
	hold both switches up	`Config: Wait...`
	after 4 seconds you can	`Config: Ready !`
	release the switches	`TCPIP Address` `192.168.91.80`
Select submenu "TCPIP Gateway"	M▲ or M▼ (until right menu is displayed)	`TCPIP Gateway` `192.168.91.94`
Enter this menu	P▲	`192.168.91.94`
Change the value	M▲ or M▼	`196.168.91.94`
Accept change, to next item	P▲	`196.168.91.94`
Accept change, to next item	P▲	`196.168.91.94`
Accept change, to next item	P▲	`196.168.91.94`
Ready, back to submenu selection	P▲	`TCPIP Gateway` `196.168.91.94`
Ready, leave submenu	M▼	`TCPIP: no link`

2.9.3 Main Operating Modes and Associated Submenus

Operating Mode	Submenu	Display
Display voltage and current of the selected output channel		`U0  5.01V  72.A`
Display the TCP/IP connection state Possible values & symbols are: no link (no cable connected) 10M (connected to 10M network) 100M (connected to 100M network) HD (half duplex) FD (full duplex) ↓, ↑, ↕ (Frame received, transmitted, both)		`Ethernet 100M FD`

1 Display: Two lines: displayed alternating, alternate background color: blinking

Operating Mode	Submenu	Display
	Change the TCP/IP address	`TCPIP Address 192.168.91.80`
	Change the TCP/IP subnet mask	`TCPIP SubnetMask 255.255.255.224`
	Change the TCP/IP gateway address	`TCPIP Gateway 192.168.91.94`
	Allow writes (e.g. switch on/off) via the web server	`HTTP:read/write`
	Change TCP/IP negotiation settings	`TCPIPnegotiation AutoNegotiation`
	Display of the ethernet hardware address (MAC). This address is written at the type plate, too.	`TCPIP MAC Addres 0050-C22D-C231`
	Change the TCP/IP port of the web server	`HTTP Port 80`
	Change the TCP/IP port of the SNMP server	`SNMP Port 161`
	Restore the default SNMP settings (community strings)	`SNMP Default No`

2.10 Power Output

The low voltage DC output at the rear side of the power supply is provided by two 6 mm sockets

The main application of this device is working as constant current source, so voltage sense lines are omitted.

3 PG501 Control and Setup via USB

The PG501 can be controlled with the MRIcontrol software. Without the *Display* option this is the only way to change the network (TCP/IP) settings.

The USB interface is primarily intended to be used to configure the power supply. The Ethernet connection is designated for remote control and monitoring.

Requirements

- X86-Computer with USB connection (USB2 recommended)
- Microsoft Windows XP

Features

- Setup of the TCP/IP network parameters
- Global overview of all power supply channels
- Detailed configuration of the power supply channels
- Save and reload of configuration data

3.1 Installation

The installation software (MRIcontroInstall-x.x.x.x.exe) is free available at the download area of our website (www.wiener-d.com → Support → Downloads, registration required). The direct link of the Juli 2010 version is

http://www.wiener-d.com/Support/MRIcontrol/MRIcontrolInstall-1.0.1161.0.exe

Please install the software before connecting the power supply to the USB. The necessary USB-driver is included in the installation.

After downloading and executing the software Windows may complain that the supplier of the software could not be verified. Ignore this warning and select “Execute”.

Next the MRIcontrol Setup Wizard welcome screen is displayed. Click “Next”, accept the license agreement and take a look at the ReadMe notes.

Now you may change the default installation folder and start the installation.

MRIcontrol Setup
Welcome to the MRIcontrol Setup Wizard
This wizard will guide you through the installation of MRIcontrol.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

Now connect the PG501 with your mains supply and use an USB cable to connect the computer with the PG501.

The computer will detect the new connected hardware and ask to connect to Windows Update. Select “No” and click “Continue”.

Then accept the “Automatic install the software” selection by clicking “continue”.

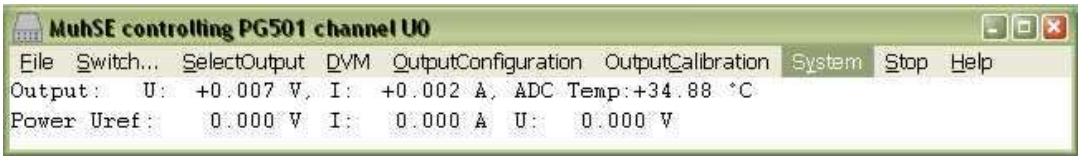
Assistent für das Suchen neuer Hardware
Willkommen
Es wird nach aktueller und aktualisierter Software auf dem Computer, auf der Hardwareinstallations-CD oder auf der Windows Update-Website (mit Ihrer Erlaubnis) gesucht.
Datenschutzrichtlinie anzeigen
Soll eine Verbindung mit Windows Update hergestellt werden, um nach Software zu suchen?
Ja, nur diese eine Mal
Ja, und jedes Mal, wenn ein Gerät angeschlossen wird
Nein, diesmal nicht
Klicken Sie auf "Weiter", um den Vorgang fortzusetzen.
< Zurück
Weiter >
Abbrechen

Assistent für das Suchen neuer Hardware
Mit diesem Assistenten können Sie Software für die folgende Hardwarekomponente installieren:
PL600 Power Supply
Falls die Hardwarekomponente mit einer CD oder Diskette geliefert wurde, legen Sie diese jetzt ein.
Wie möchten Sie vorgehen?
Software automatisch installieren (empfohlen)
Software von einer Liste oder bestimmten Quelle installieren (für fortgeschrittene Benutzer)
Klicken Sie auf "Weiter", um den Vorgang fortzusetzen.
< Zurück
Weiter >
Abbrechen

Now the USB driver software will be installed. To access the power supply, execute the “MRIcontrol” application via the Windows start menu.

3.2 The Main Window

After starting the application the main window appears.


MuhSE controlling PG501 channel U0
File Switch... SelectOutput DVM OutputConfiguration OutputCalibration System Stop Help
Output: U: +0.007 V, I: +0.002 A, ADC Temp:+34.88 °C
Power Uref: 0.000 V I: 0.000 A U: 0.000 V

The „Output“ line shows the overview of the supply output, the „Power“ line shows some values of the internal supply which generates the input voltage needed by the output driver.

For quick access the the OutputConfiguration and DVM dialog boxes are opened automatically.

3.3 Description of the Menu Items

- File » Read Power Supply Configuration from File

  Opens the Read Power Supply Data From File Dialog.
- File » Save Power Supply Configuration to File

  Saves the complete power supply configuration to disk.
- Switch » Main On
- Switch » Mai Off

  This allows to switch the main supply on or off. Functional identical to the green rocker switch or the power on/off switch of the optional display.
- Switch » Group 1 On
- Switch » Group 1 Off
- Switch » Group 2 On
- Switch » Group 2 Off

This are commands to demonstrate the grouping functions of the PG. They make sense only with power boxes containing more than one channel.

- SelectOutput

  Select the next existing channel for the other dialogs. The current channel is displayed at the title bar. If just one channel exists, this item can be ignored.

- DVM

  Opens a large window showing the measurement data of one channel.

- OutputConfiguration

  Opens the Output Configuration Dialog.

- OutputCalibration

  This dialog is reserved for service personal.

- System » Configuration

  Opens the Global and Network Configuration Dialog.

- System » Firmware Update

  Allows to update the firmware of the main processor.

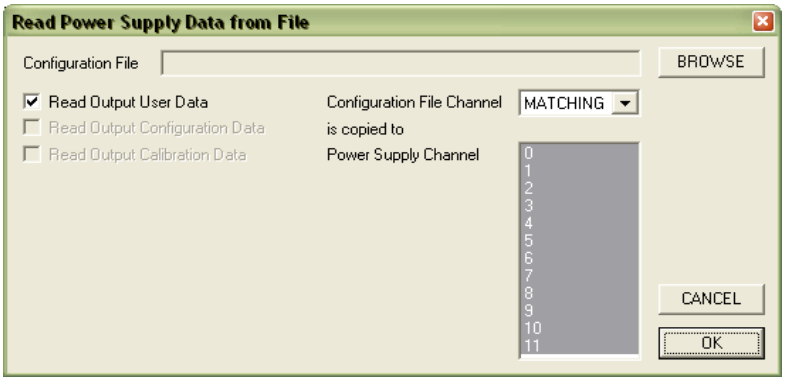
- Stop
- Start

  Allow to interrupt and resume the communication with the PG501.

- Help » Info

  Here you have access to the version number of the software.

3.3.1 Read Power Supply Data From File Dialog

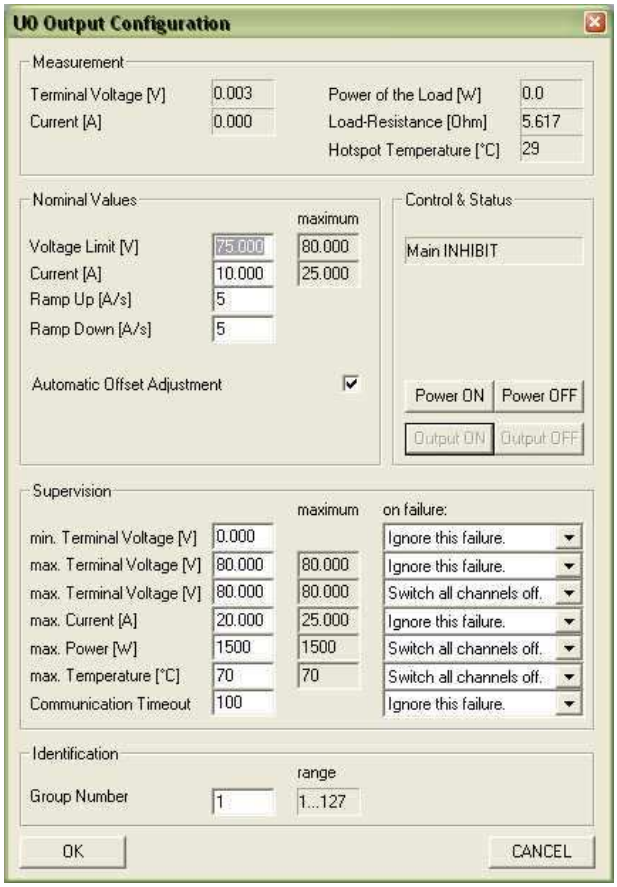


This dialog can be used to copy a XML configuration file from disk to the PG501.

It is possible to copy each configuration file channel to its corresponding power supply channel (e.g. U0 → U0, U1 → U1, ...) or to copy one configuration file channel to multiple power supply channels.

3.3.2 Output Configuration Dialog

The OutputConfiguration dialog box is used for the detailed control of the output channels. The following steps are required to switch on the output channel:



You see the measured voltage and current and the calculated power and resistance of the load.

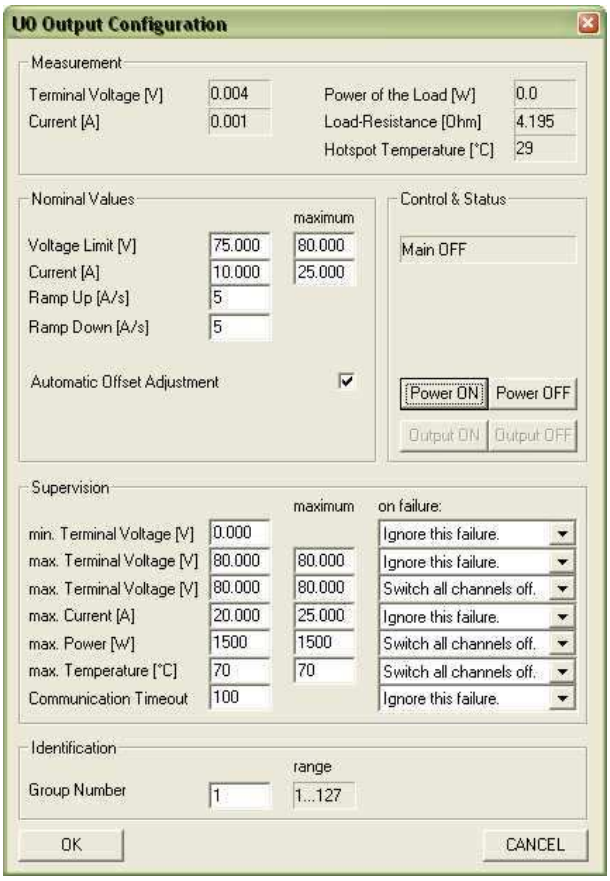
The Nominal Values area allows to change the operation parameters. „Automatic Offset Adjustment“ checkbox should be enabled, it provides automatic correction of the offset drift of the DAC.

The Control&Status area shows the actual state of the device.

> INHIBIT: The power supply is locked, either by hardware interlock or by the ON/OFF-switch at the front panel.

Systems with the “Display” option can be switched on with the red main switch at the front panel, or with the “Switch → Main On” menu with this program.

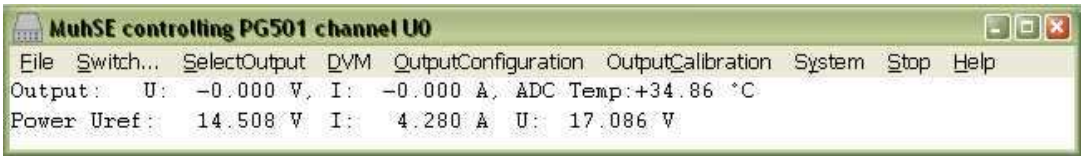
Systems without the display option have to be switched on with the green rocker switch.

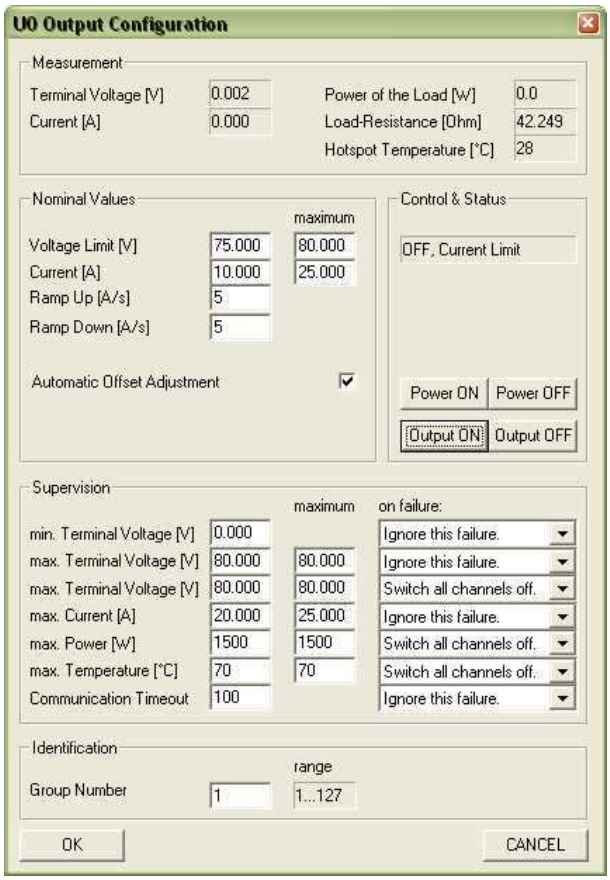


With the „Power ON“ and „Power OFF“ buttons you switch the internal power stage (MEH, see figure 1.1).

Click the „Power ON“ button to activate it.

The main window shows a reference voltage and the current and voltage of the internal supply:


MuhSE controlling PG501 channel U0
File Switch... SelectOutput DVM OutputConfiguration OutputCalibration System Stop Help
Output: U: -0.000 V, I: -0.000 A, ADC Temp:+34.86 °C
Power Uref: 14.508 V I: 4.280 A U: 17.086 V



Verify that the nominal values do not damage your connected load.

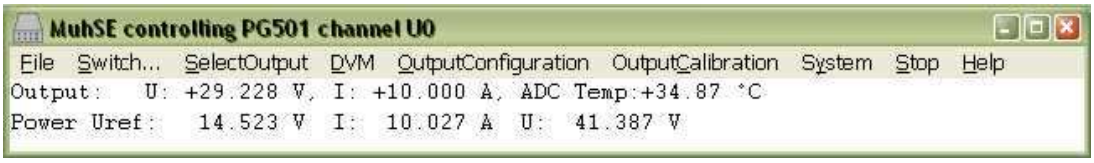
The „Supervision“ area allows to set multiple supervision values, which trigger different actions.

E.g. you can set one „max. Terminal Voltage“ value to 30V and ignore the failure (just the status changes), and set the second „max. Terminal Voltage“ to 60V and request to switch off if the value is touched.

Next click the „Output ON“ button,

The output current will rise to the selected value with the defined ramp, or the „Voltage Limit“ is reached.

The main window is updated with the actual output values

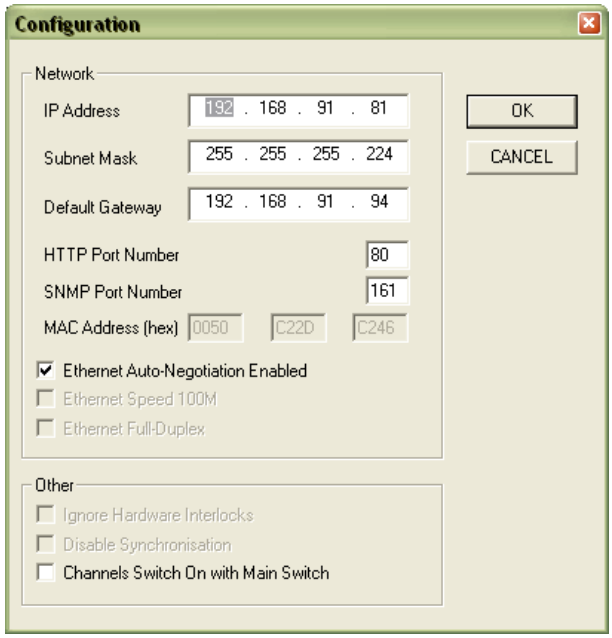

MuhSE controlling PG501 channel U0
File Switch... SelectOutput DVM OutputConfiguration OutputCalibration System Stop Help
Output: U: +29.228 V, I: +10.000 A, ADC Temp:+34.87 °C
Power Uref: 14.523 V I: 10.027 A U: 41.387 V

3.3.3 Global and Network Configuration Dialog

In the *Network* group box you enter the TCP/IP network settings (IP address, subnet mask and default gateway). You have to use the parameters of your local network here. Please contact your network administrator for details.

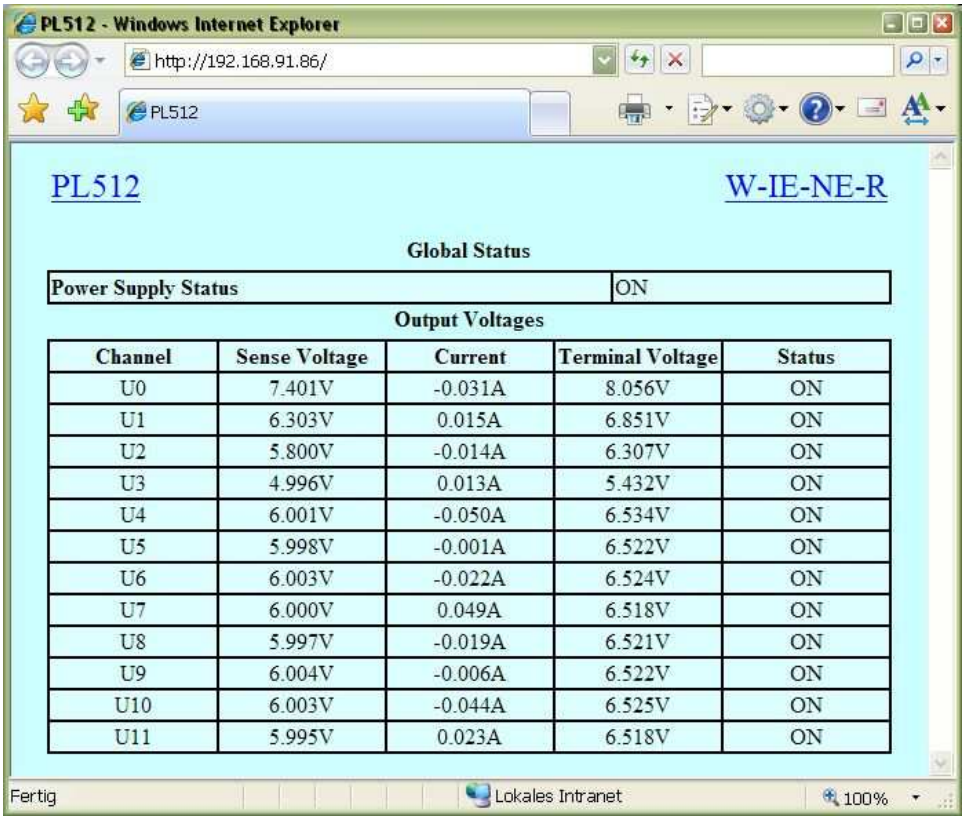
HTTP and SNMP port numbers should only modified if you know what you do. Setting any port to 0 disables the server.

If the “Channels Switch On with Main Switch” check box in the *Other* group box is checked, all output channels are switched on if the main switch is switched on.



4 Web Server

The PG501 has a built-in web-server which allows the monitoring of the power supply with a standard web browser.



5 SNMP Control

The SNMP (Simple Network Management Protocol) is generally used to monitor and control computers and network routers.

WIENER claimed a specific part of the SNMP namespace and implemented power supply specific items there. Protocol version 1 and 2c is implemented.

The tree view of the implemented items is appended in 7 SNMP OID Tree.

A detailed description of the SNMP functionality can be found in the corresponding MIB file (WIENER-CRATE-MIB.txt)

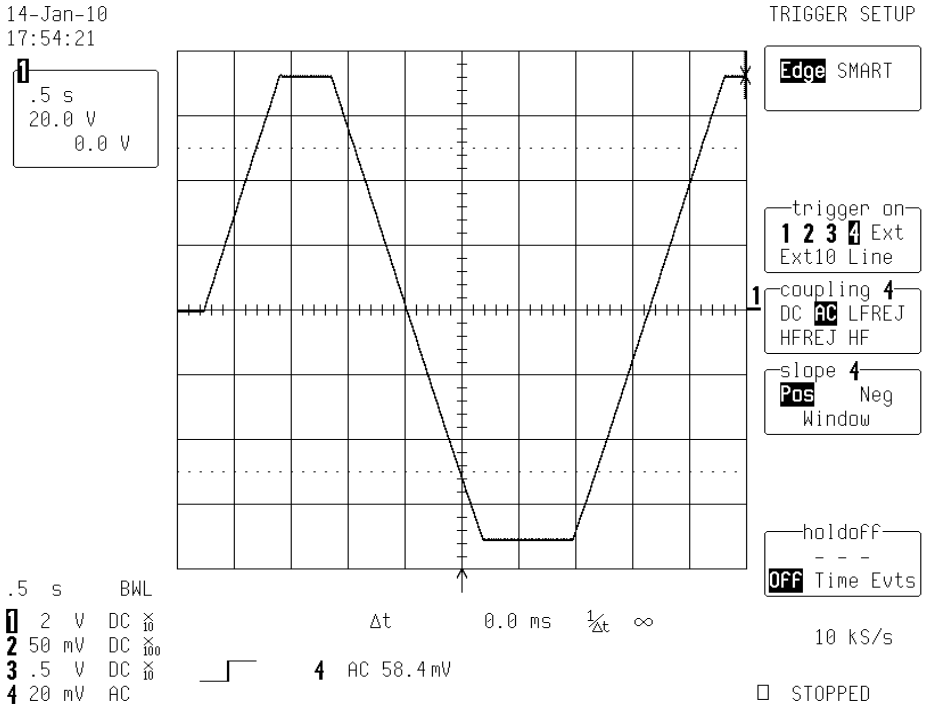
If you are new to SNMP the www.Net-SNMP.org website is a good start.

The TCP/IP settings can be configured with the MUSEcontrol -> System -> Configuration menu. The default setting ist he IP address 0.0.0.0, which activate the BOOTP/DHCP facility of the PG501 to get it's IP address automatically.

Using NetSNMP (www.netsnmp.org), it's easy to generate different output waveforms. The sample script

```
snmpset -c guru -v 2c $CRATE outputSwitch.u0 i Off
sleep 1
snmpset -c guru -v 2c $CRATE outputCurrent.u0 F 20
snmpset -c guru -v 2c $CRATE outputSwitch.u0 i On
sleep 1
snmpset -c guru -v 2c $CRATE outputCurrent.u0 F -20
sleep 1
snmpset -c guru -v 2c $CRATE outputCurrent.u0 F 20
```

generates the output voltage (3.6 Ohm load resistance)



6 OPC Server

A server according to OPC Data Access V2.05 is optional available.

OPC (**O**LE for **P**rocess **C**ontrol) allows fast and secure access to data and information under Windows operating systems. As an industry-spanning, multi-vendor software interface, OPC minimizes connection and maintenance overheads.

This server, running on a Computer with the Microsoft Windows XP operating system, enables access to all controllers which are connected to the network (TCP/IP). It is possible to

- access from any OPC Client application to the data of one or more servers
- encapsulating the properties specific to the server and type of communication
- commissioning support due to automatic scanning of the network and registration of communication stations
- restricting access rights by the underlying Microsoft DCOM.

The details of the OPC server can be found in the manual delivered with the OPC server software.

7 The MARA Power Bin

For easy exchange of the PG501 Power Box the special bin (MARA) is provided: The low voltage/high current cabling is connected to M6 threaded bolts (MULTICONTACT).

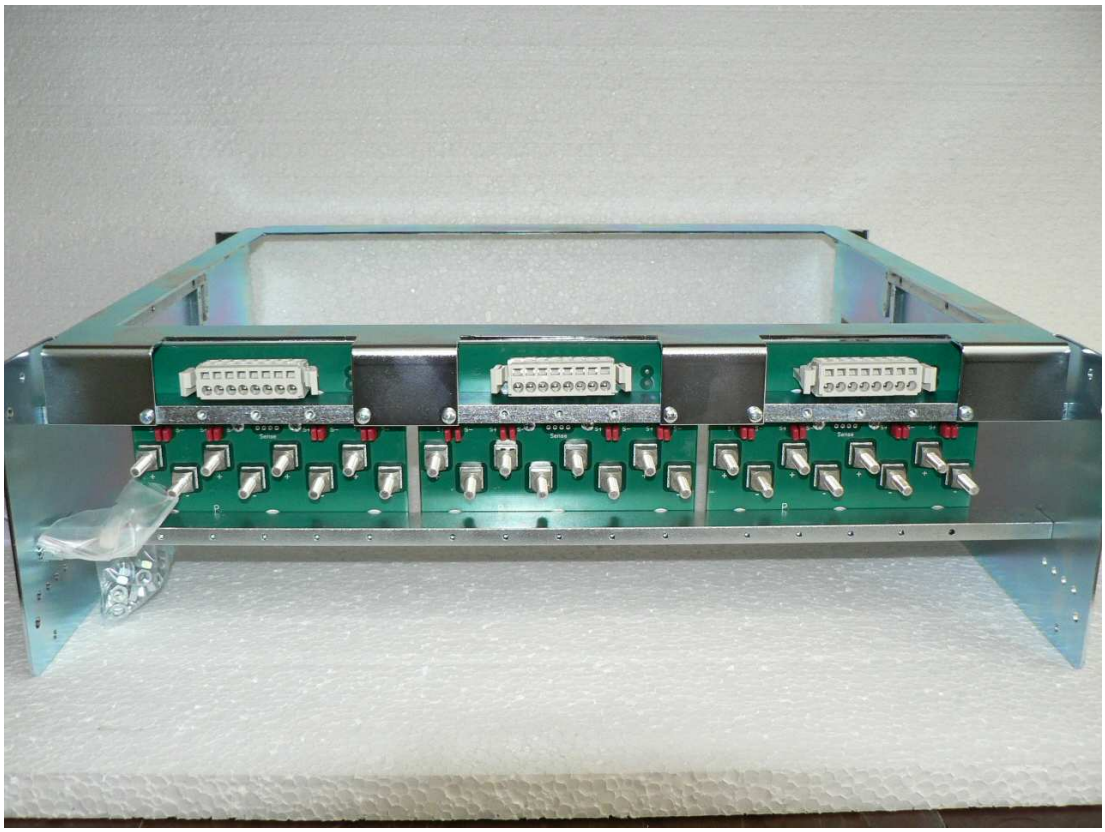


Figure 7.1: MARA Power Bin

Appendix A: Measurements

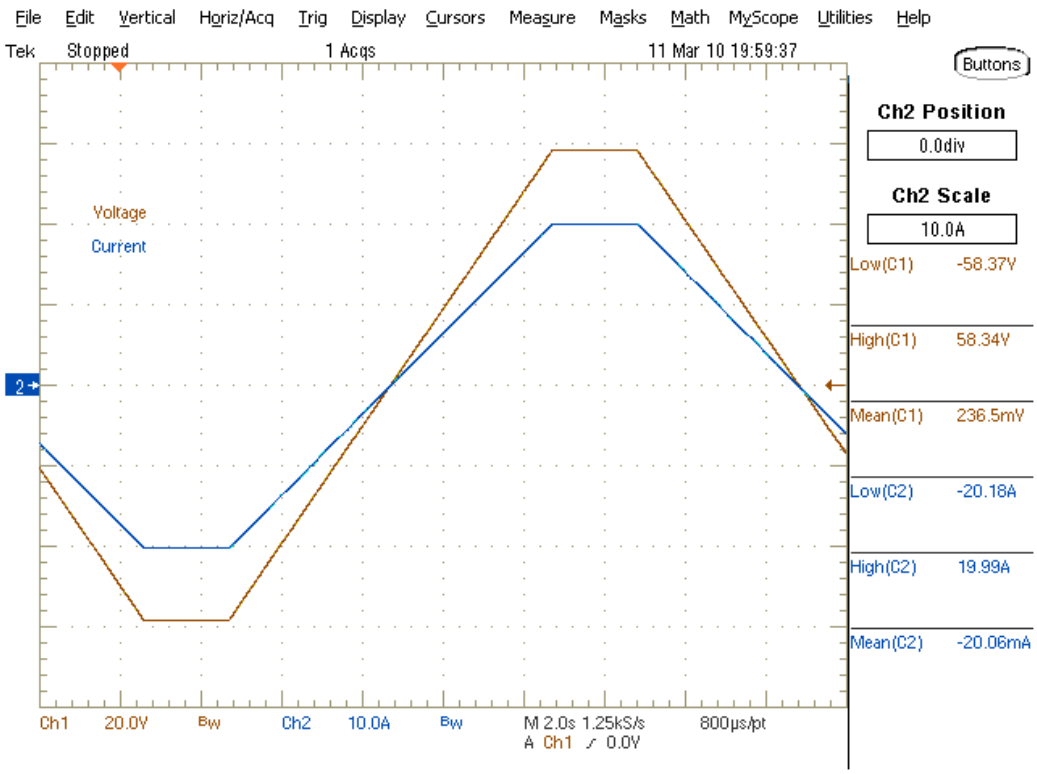


Figure 7.2 +/- 20A, 5A/s rise time connected to 2.9 Ohm, Resistor

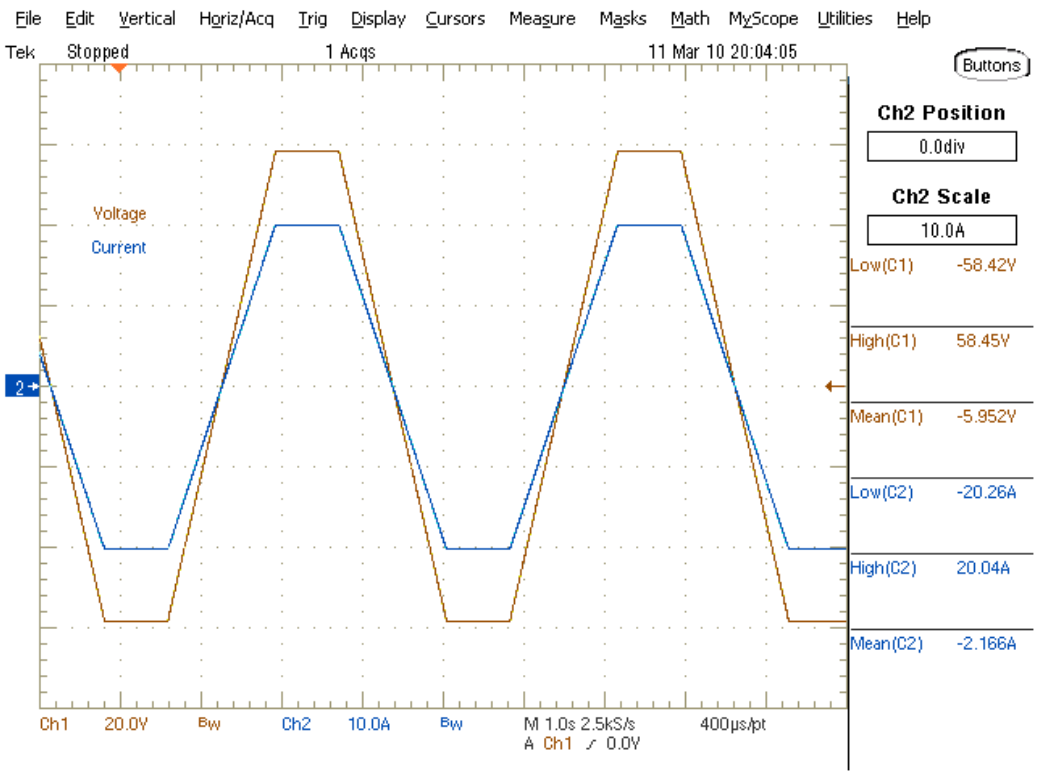


Figure 7.3 +/- 20A, 30A/s rise time connected to 2.9 Ohm, Resistor

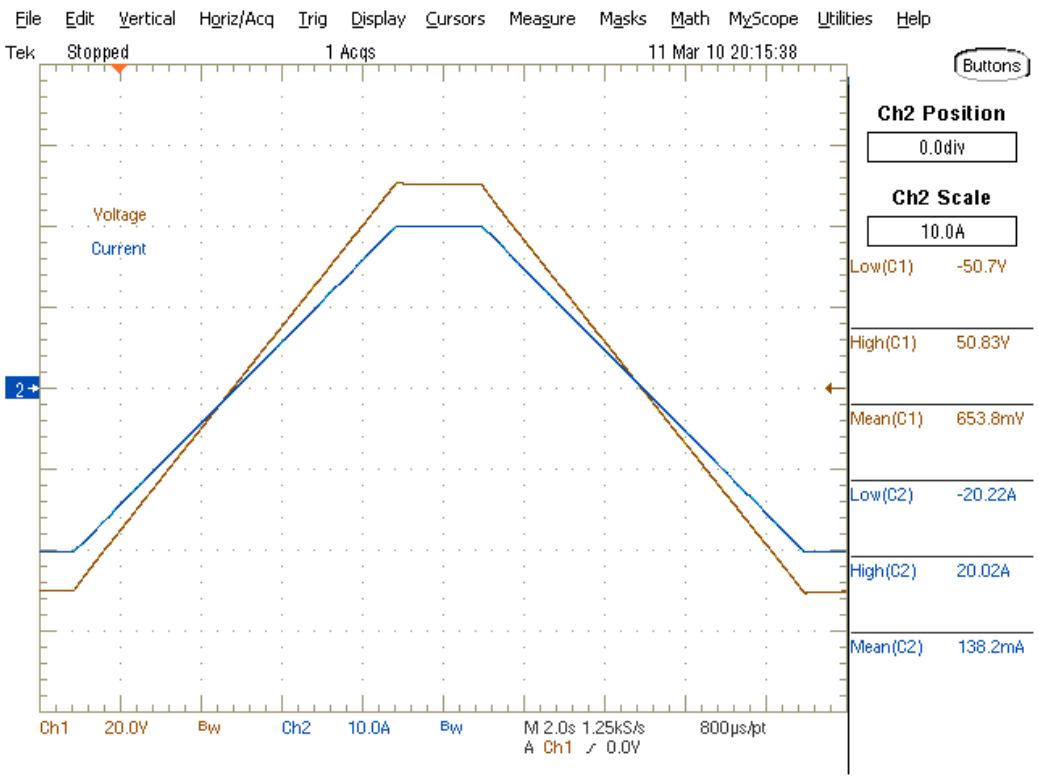


Figure 7.4 +/- 20A, 5A/s rise time connected to 2.9 Ohm Resistor and 2.2 H/18 Ohm Inductance

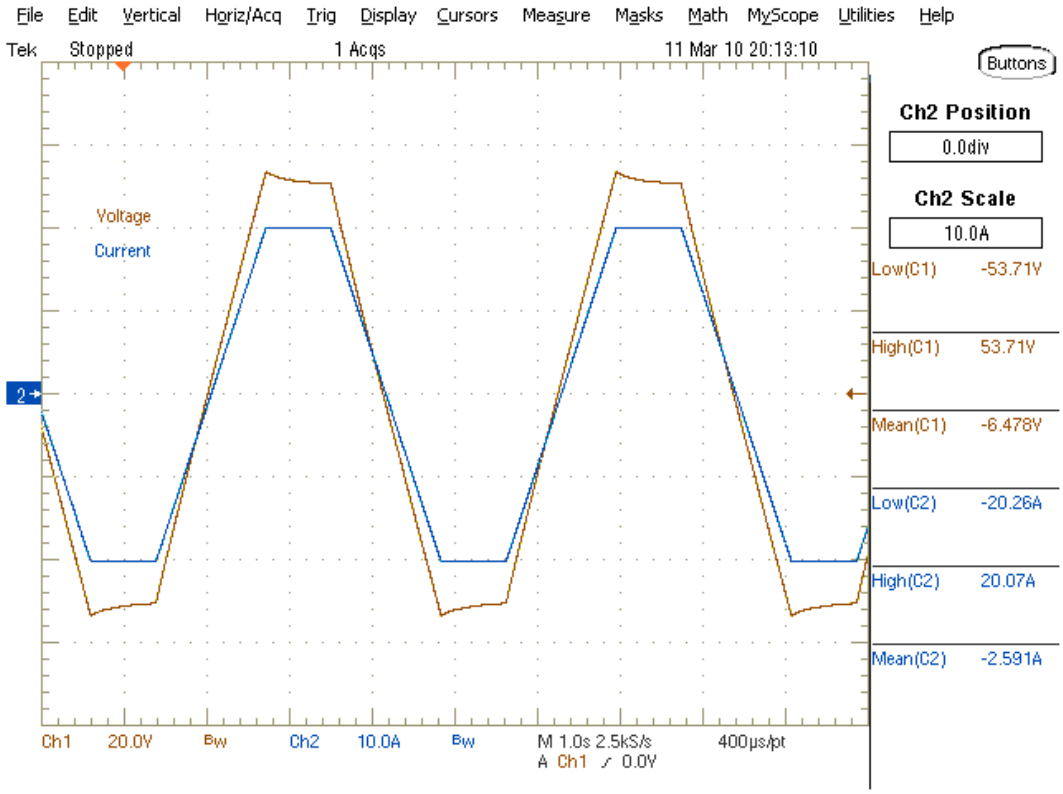


Figure 7.5 +/- 20A, 30A/s rise time connected to 2.9 Ohm Resistor and 2.2 H/18 Ohm Inductance

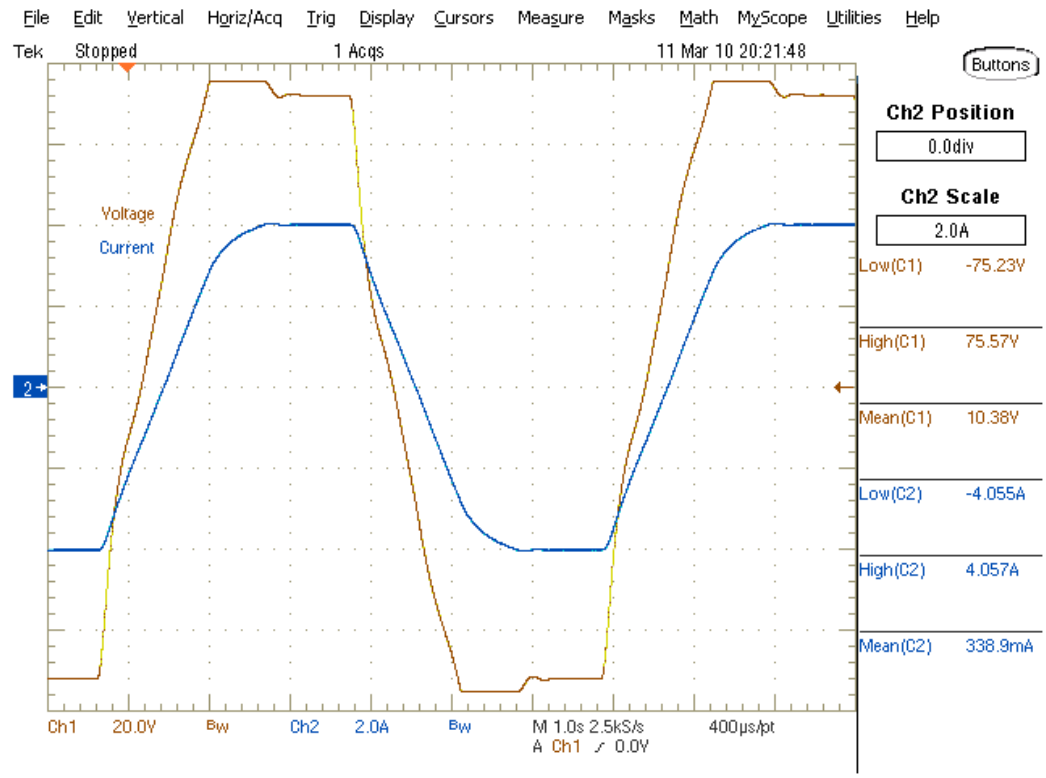


Figure 7.6 +/- 4A, 5A/s rise time connected to 2.2 H/18 Ohm Inductance

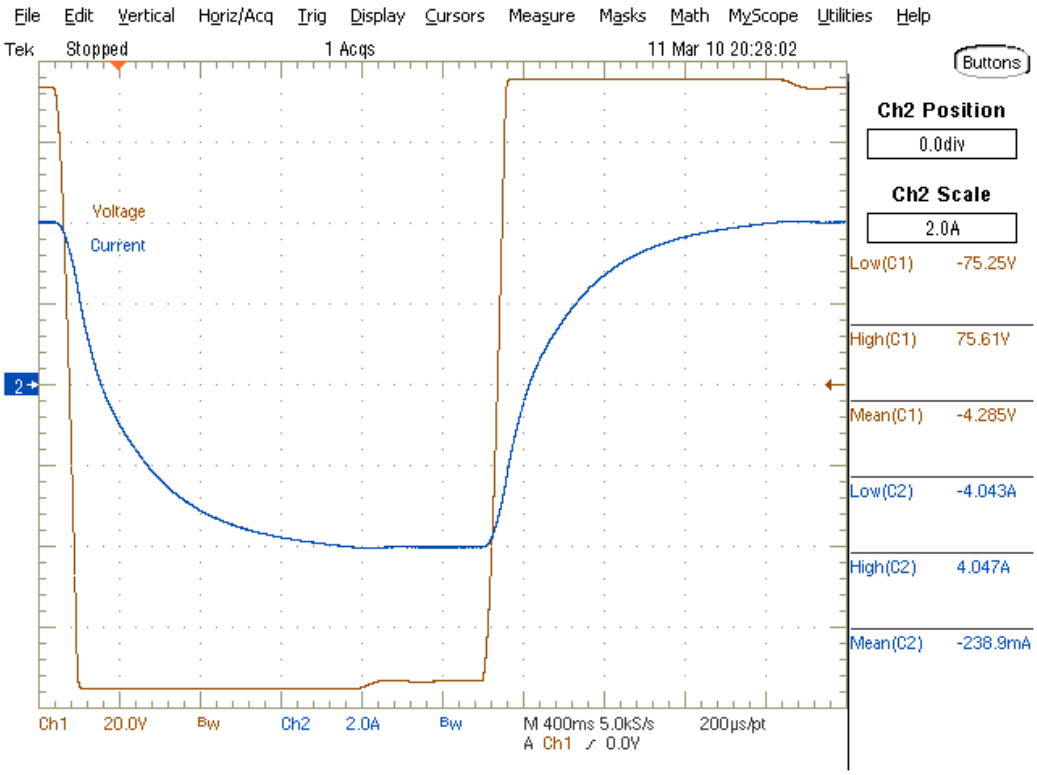


Figure 7.7+/- 4A, 30A/s rise time connected to 2.2 H/18 Ohm Inductance

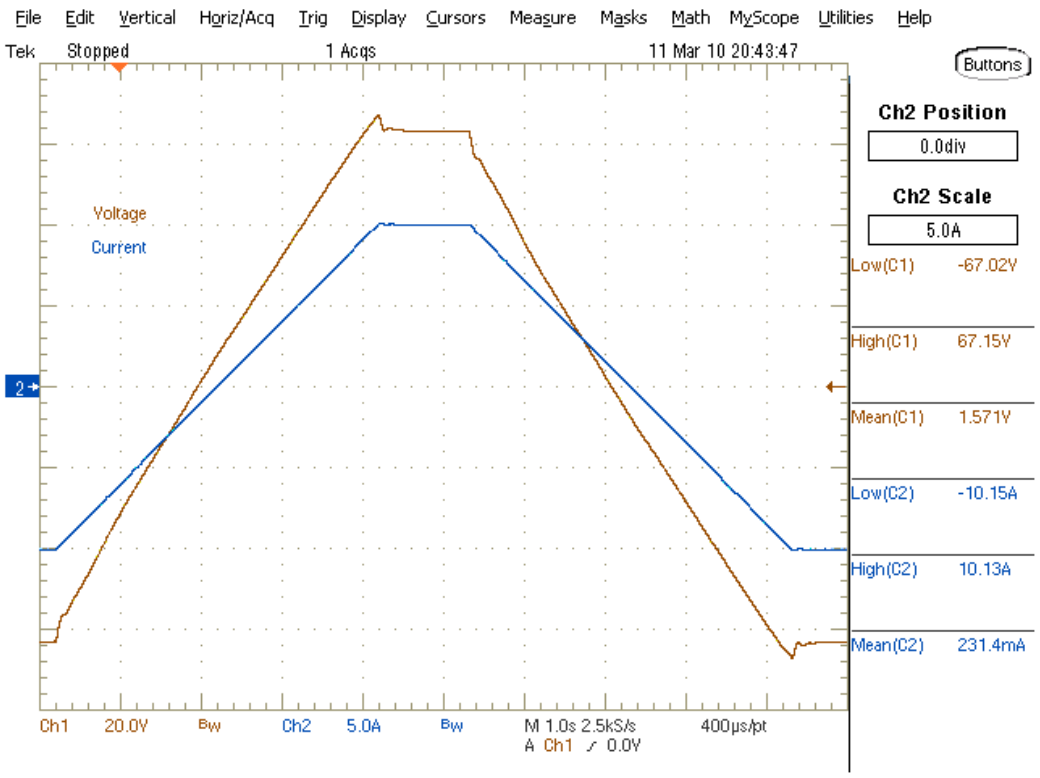


Figure 7.8+/- 10A, 5A/s rise time connected to 500mH/6 Ohm Inductance

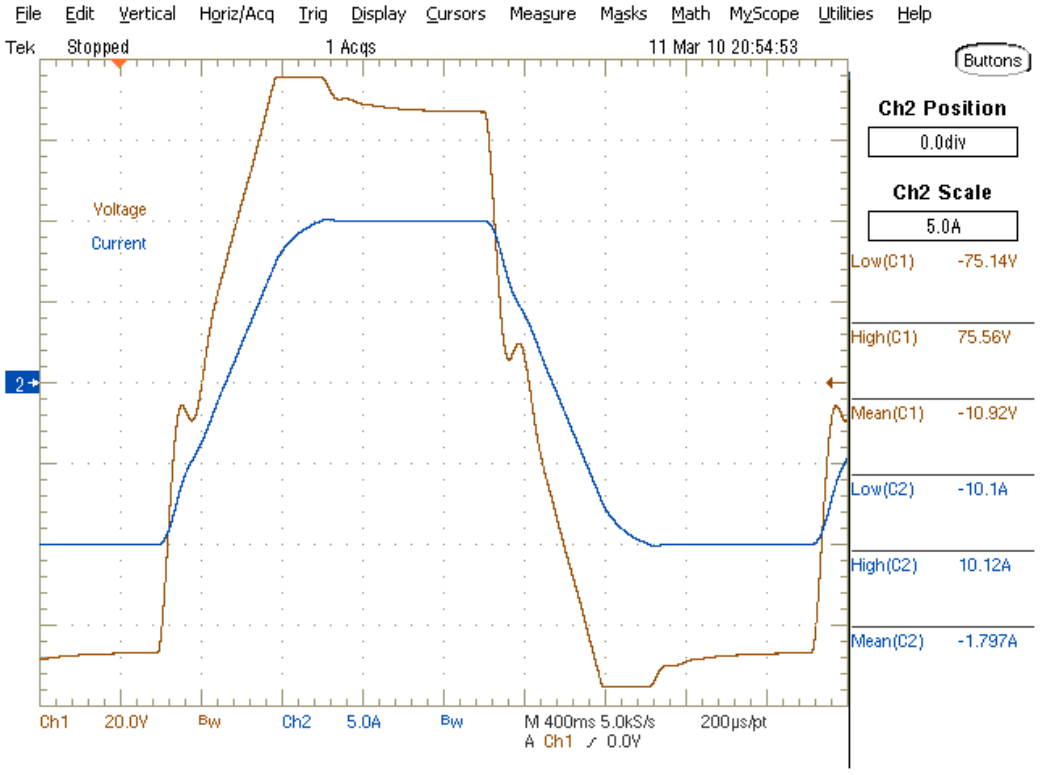


Figure 7.9+/- 10A, 30A/s rise time connected to 500mH/6 Ohm Inductance

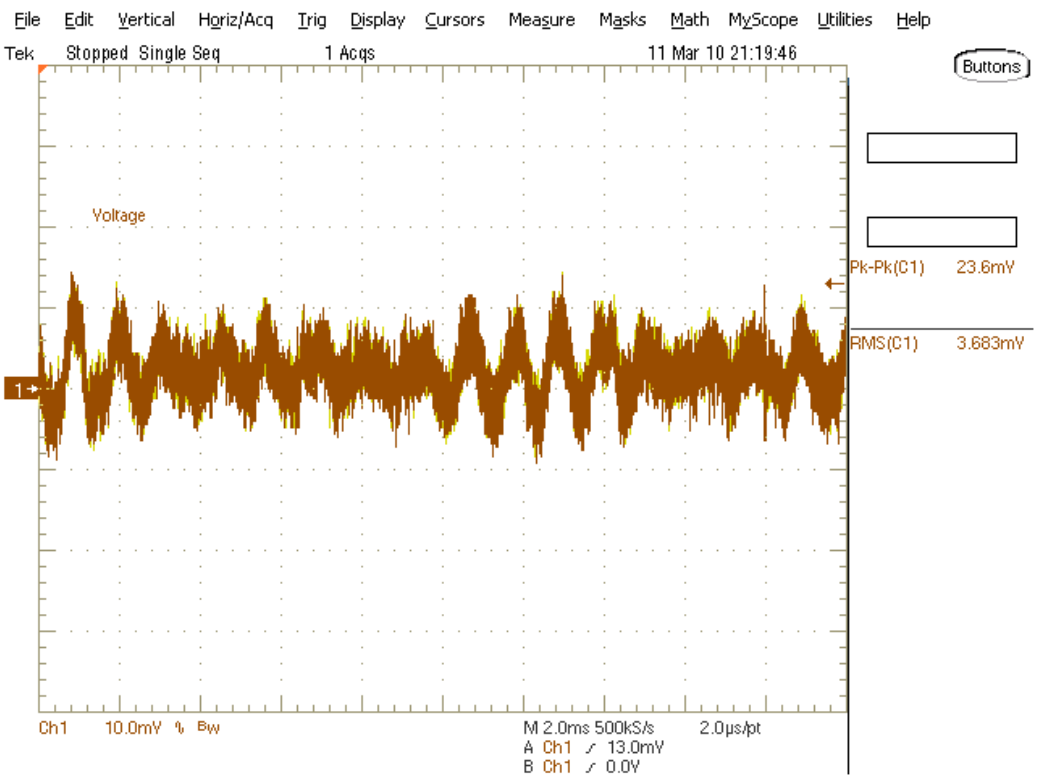

File Edit Vertical Horiz/Acq Trig Display Cursors Measure Masks Math MyScope Utilities Help
Tek Stopped Single Seq 1 Acqs 11 Mar 10 21:19:46
Buttons
Voltage
Pk-Pk(C1) 23.6mV
RMS(C1) 3.683mV
Ch1 10.0mV ∿ Bw
M 2.0ms 500kS/s 2.0µs/pt
A Ch1 ⟋ 13.0mV
B Ch1 ⟋ 0.0V

Figure 7.10 Noise 10A, 75V, resistive load

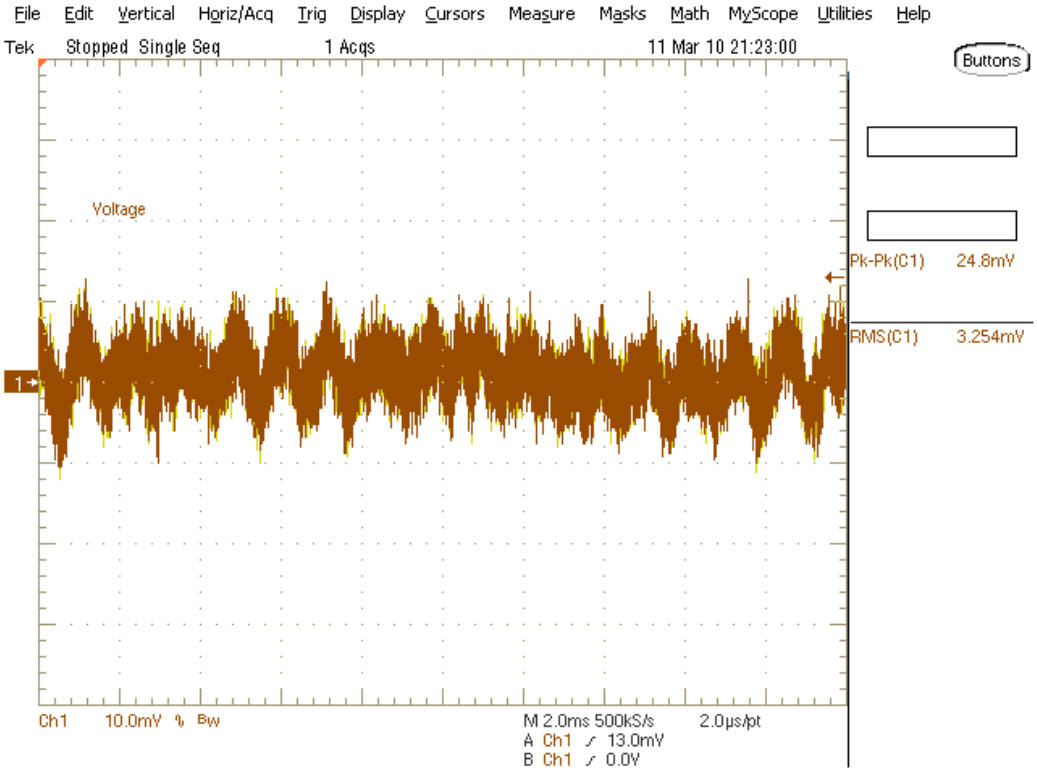

File Edit Vertical Horiz/Acq Trig Display Cursors Measure Masks Math MyScope Utilities Help
Tek Stopped Single Seq 1 Acqs 11 Mar 10 21:23:00
Buttons
Voltage
Pk-Pk(C1) 24.8mV
RMS(C1) 3.254mV
Ch1 10.0mV ∿ Bw
M 2.0ms 500kS/s 2.0µs/pt
A Ch1 ⟋ 13.0mV
B Ch1 ⟋ 0.0V

Figure 7.11 Noise 20A, 60V, resistive load

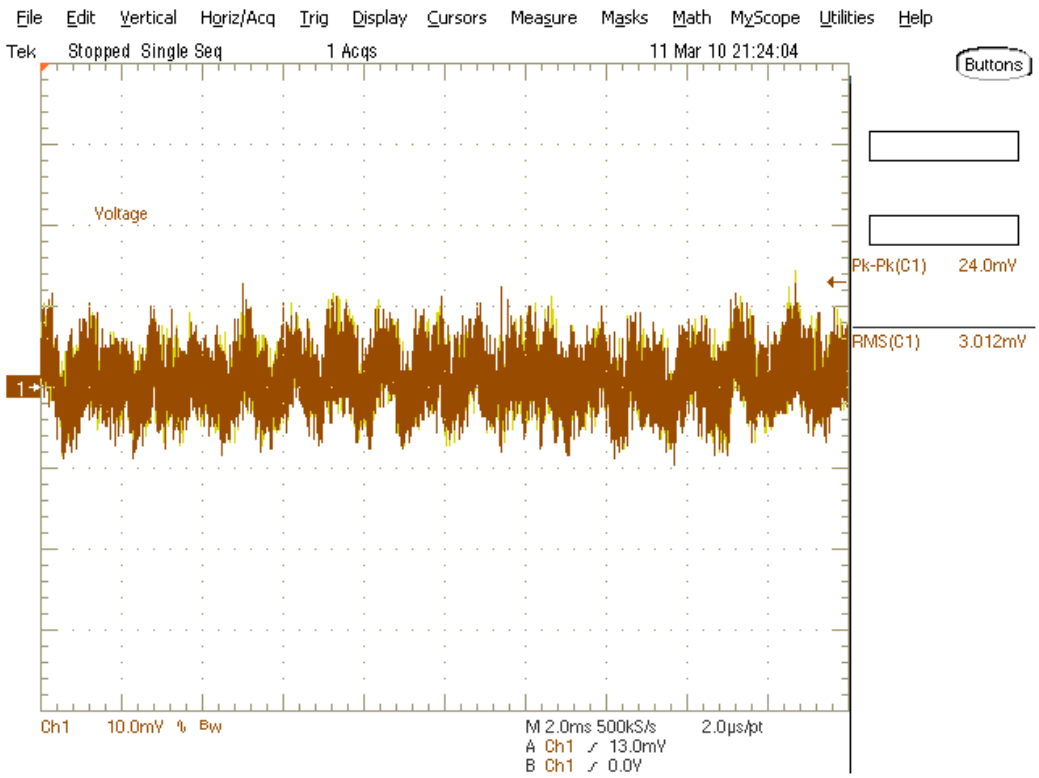

File Edit Vertical Horiz/Acq Trig Display Cursors Measure Masks Math MyScope Utilities Help
Tek Stopped Single Seq 1 Acqs 11 Mar 10 21:24:04
Buttons
Voltage
Pk-Pk(C1) 24.0mV
RMS(C1) 3.012mV
Ch1 10.0mV Bw
M 2.0ms 500kS/s 2.0µs/pt
A Ch1 ⨍ 13.0mV
B Ch1 ⨍ 0.0V

Figure 7.12Noise 20A, 20V, resistive load

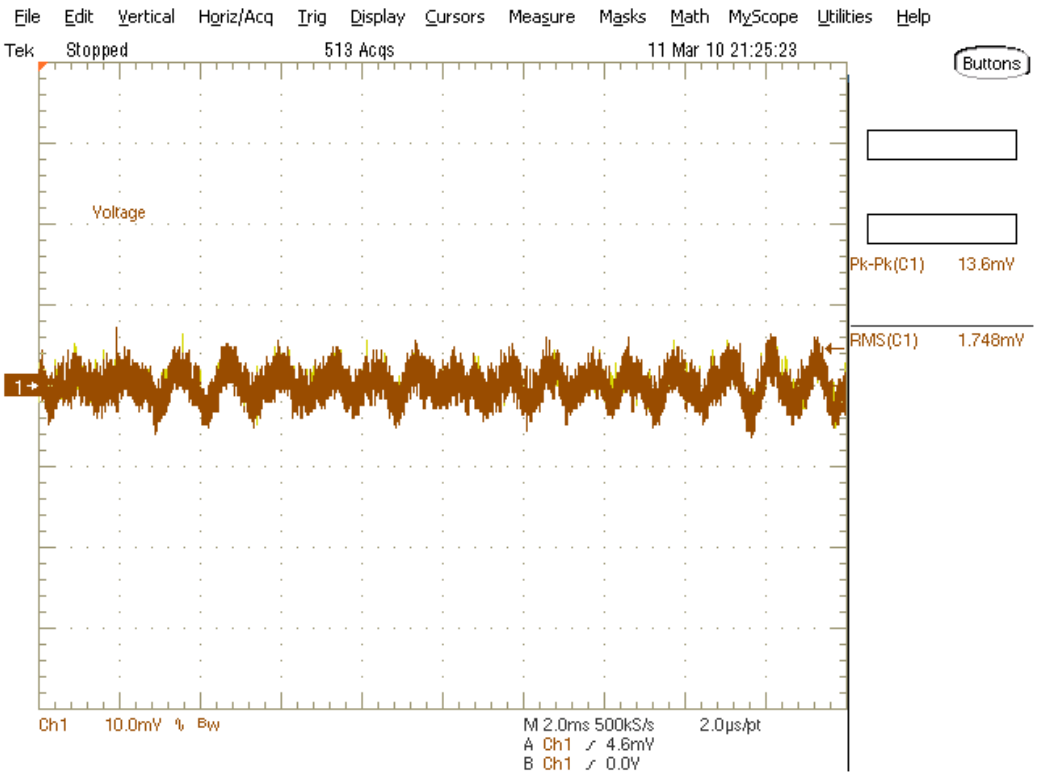

File Edit Vertical Horiz/Acq Trig Display Cursors Measure Masks Math MyScope Utilities Help
Tek Stopped 513 Acqs 11 Mar 10 21:25:23
Buttons
Voltage
Pk-Pk(C1) 13.6mV
RMS(C1) 1.748mV
Ch1 10.0mV Bw
M 2.0ms 500kS/s 2.0µs/pt
A Ch1 ⨍ 4.6mV
B Ch1 ⨍ 0.0V

Figure 7.13Noise 20A, 2V, resistive load 100 mOhm

Appendix B: Data Sheet

Rated Input Voltage:	106 – 230 V AC, +/- 15% variation allowed	
Rated Input Current:	16 A	
Sinusoidal:	**CE**	EN 60555, IEC 555 pow. fact. 0,98 (230VAC) 50/60 Hz
Inrush current:		16 A, cold unit
Output Insulation (SELV)	**CE**	EN 60950 , ISO 380, VDE 0805, UL 1950, C22.2.950

DC Output power with different input voltages at the rated current (16A), calculated with typical efficiency of 75%

90-230VAC / 400 Wnom

DC Output Characteristics:

Floating range:	500 V test voltage	
Noise and ripple:	< 35 mV_{PP}	(0.5 m wire, 0–20 MHz)
Conditions at the load:	Parallel (X) 330µF and 1µF ceramic, 100nF HF- conducting to case (Y) each line	

Emission:	CE EN 50081-1 (EN 55 022-B)
Immunity:	CE EN 50082-1 or 2
Operating temperature:	10 °C – 40 °C
Storage Temperature:	- 30 °C - + 85 °C (cooling water must be completely removed, else +3 °C - +85 °C)
Temp.- Coefficient:	tbd
Stability (constant conditions)	tbd
Current limiting:	Programmable
Status control / DC Off (trip off):	Tripping global, group- or channel wise programmable (after overload, overheat , overvoltage, undervoltage)
Interlock input:	Optional

Measurement Accuracy (typical values)

Voltage	± 0.5% of the maximum output voltage of the channel
Current	± 0.1% of the maximum output voltage of the channel

Appendix C: SNMP OID Tree

Only a small part of general SNMP OIDs is implemented. This is the tree view:

```
+--iso(1)
   |
   +--org(3)
      |
      +--dod(6)
         |
         +--internet(1)
            |
            +--directory(1)
            |
            +--mgmt(2)
            |  |
            |  +--mib-2(1)
            |     |
            |     +--system(1)
            |     |  |
            |     |  +-- -R-- String    sysDescr(1)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -R-- ObjID     sysObjectID(2)
            |     |  +-- -R-- TimeTicks sysUpTime(3)
            |     |  +-- -RW- String    sysContact(4)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -RW- String    sysName(5)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -RW- String    sysLocation(6)
            |     |  |        Textual Convention: DisplayString
            |     |  |        Size: 0..255
            |     |  +-- -R-- INTEGER   sysServices(7)
            |     |  |        Range: 0..127
```

This is the tree view of the wiener-specific SNMP namespace. It could be generated with the command „snmptranslate -w 80 -Tp WIENER-CRATE-MIB::wiener“. Because it's a general definition, usable for different types of crates, some items may be not implemented in the real hardware. Here the not relevant parts are omitted.

The wiener OID is located at iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).

A detailed description of the SNMP functionality can be found in the corresponding MIB file (WIENER-CRATE-MIB.txt)

```
+--crate(1)
   |
   +--system(1)
   |  |
   |  +-- -RW- EnumVal   sysMainSwitch(1)
   |  |        Values: OFF(0), ON(1)
   |  +-- -R-- BitString sysStatus(2)
   |  |        Values: mainOn(0), mainInhibit(1), localControlOnly(2),
   |  |                inputFailure(3), outputFailure(4), fantrayFailure(5),
   |  |                sensorFailure(6), VmeSysfail(7),
   |  |                plugAndPlayIncompatible(8)
   |  +-- -RW- EnumVal   sysVmeSysReset(3)
   |           Values: TRIGGER(1)
   |
   +--input(2)
   |
   +--output(3)
   |  |
   |  +-- -R-- INTEGER   outputNumber(1)
   |  |        Range: 0..255
   |  |
   |  +--outputTable(2)
   |  |  |
   |  |  +--outputEntry(1)
   |  |     |  Index: outputIndex
   |  |     |
   |  |     +-- ---- EnumVal   outputIndex(1)
   |  |     |        Values: U0(1), U1(2), U2(3), U3(4), U4(5), U5(6), U6(7),
   |  |     |                U7(8), U8(9), U9(10), U10(11), U11(12)
   |  |     +-- -R-- String    outputName(2)
```

```
|  |     |        Textual Convention: DisplayString
|  |     |        Size: 1..4
|  |     +-- -RW- INTEGER   outputGroup(3)
|  |     |        Range: 0..127
|  |     +-- -R-- BitString outputStatus(4)
|  |     |        Values: outputOn(0), outputInhibit(1),
|  |     |                outputFailureMinSenseVoltage(2),
|  |     |                outputFailureMaxSenseVoltage(3),
|  |     |                outputFailureMaxTerminalVoltage(4),
|  |     |                outputFailureMaxCurrent(5),
|  |     |                outputFailureMaxTemperature(6),
|  |     |                outputFailureMaxPower(7),
|  |     |                outputFailureTimeout(9),
|  |     |                outputCurrentLimited(10), outputRampUp(11),
|  |     |                outputRampDown(12)
|  |     +-- -R-- Opaque    outputMeasurementSenseVoltage(5)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -R-- Opaque    outputMeasurementTerminalVoltage(6)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -R-- Opaque    outputMeasurementCurrent(7)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -R-- EnumVal   outputMeasurementTemperature(8)
|  |     |        Values: OK(-128), FAILURE(127)
|  |     +-- -RW- EnumVal   outputSwitch(9)
|  |     |        Values: OFF(0), ON(1)
|  |     +-- -RW- Opaque    outputVoltage(10)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- INTEGER   outputAdjustVoltage(11)
|  |     |        Range: -128..127
|  |     +-- -RW- Opaque    outputCurrent(12)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- INTEGER   outputSupervisionBehavior(15)
|  |     |        Range: 0..65535
|  |     +-- -RW- Opaque    outputSupervisionMinSenseVoltage(16)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputSupervisionMaxSenseVoltage(17)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputSupervisionMaxTerminalVoltage(18)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputSupervisionMaxCurrent(19)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputConfigMaxSenseVoltage(21)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputConfigMaxTerminalVoltage(22)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputConfigMaxCurrent(23)
|  |     |        Textual Convention: Float
|  |     |        Size: 7
|  |     +-- -RW- Opaque    outputSupervisionMaxPower(24)
|  |              Textual Convention: Float
|  |              Size: 7
|  |
|  +-- -R-- INTEGER   groupsNumber(3)
|  |        Range: 1..255
|  |
|  +--groupsTable(4)
|     |
|     +--groupsEntry(1)
|        |  Index: groupsIndex
|        |
|        +-- ---- EnumVal   groupsIndex(1)
|        |        Values: ALL(0)
|        +-- --W- EnumVal   groupsSwitch(9)
|                 Values: UNDEFINED(-1), OFF(0), ON(1)
|
+--communication(5)
|  |
|  +--snmp(1)
|     |
|     +--snmpCommunityTable(1)
```

```
|     |  |
|     |  +--snmpCommunityEntry(1)
|     |     |  Index: snmpAccessRight
|     |     |
|     |     +-- ---- EnumVal   snmpAccessRight(1)
|     |     |        Values: public(1), private(2), admin(3), guru(4)
|     |     +-- -RW- String    snmpCommunityName(2)
|     |              Size: 0..14
|     |
|     +-- -RW- INTEGER   snmpPort(2)
|
+--powersupply(6)
|  |
|  +-- -R-- String    psSerialNumber(2)
|  |        Textual Convention: DisplayString
|  |        Size: 0..255
|  +-- -R-- INTEGER   psOperatingTime(3)
|  +-- -RW- String    psDirectAccess(1024)
|           Size: 1..14
|
```